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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,615	02/25/2005	Koji Kikushima	6700-85052	7793

22242 7590 10/22/2007

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EXAMINER	
LIN, PHYOWAI	

ART UNIT	PAPER NUMBER
2613	

MAIL DATE	DELIVERY MODE
10/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,615	KIKUSHIMA, KOJI	
	Examiner	Art Unit	
	PHYOWAI LIN	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 11* is/are rejected.

7)☐ Claim(s) *7-10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02/25/2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *08/18/2005*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The references listed in the Information Disclosure Statement filed on August 18,2005 have been considered by the examiner (see attached PTO-1449 form or PTO/SB/08A and 08B forms).

Drawings

3. The drawing were received on February 25,2005. These drawings are objected because every number or item in each drawing have to be labeled based on the application's specification description.

Claim Objections

4. **Claim 6** is objected to because of the following informalities: in line 7 the claim recites "a first frequency-modulated optical signal"; however the claim provides support for " a first frequency-modulated electrical signal" as recited in specification page 29,lines 13-18. In addition, in lines 12 and 16 the claim recites "a second frequency-modulated optical signal"; however the claim provides support for " a second frequency-modulated electrical signal" as recited in specification page 29,line 24 through page 30,lines 1-2.Appropriated correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1 and 2** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuniaki et al. (JP 10-013353 attached with English translation document) in view of Myers (US Patent Number 6233254) and Yoneda et al. " Fully Engineered Multi-Channel FM-SCM Video Distribution Systems" dated by 02/94.

Regarding to claim 1, Kuniaki et al. disclose an optical signal transmitter for applying frequency modulation to amplitude-modulated electric signals that have undergone frequency division multiplexing to optically transmit the electric signals, the optical signal transmitter (see FIG.3) comprising:

a distribution circuit (branching part 7) for distributing the electric signals into a plurality of signal parts and outputting the signal parts (see page 23, [0028], lines 2-3 and FIG.3 where in input signal 10 is coupled into the branching part 7 and the input signal 10 is distributed into plurality of signal parts as two separate output signals 71 and 72);

Even though Kuniaki et al. disclose the distribution circuit with the distribution function of electrical signals part, Saeki fails to specifically disclose a plurality of

frequency modulation with the multiplexed output signals, which are coupled into light source for transmitting optical signals to an optical transmission path.

Myers discloses a plurality of frequency modulation means for applying frequency modulation to each output of the distribution circuit and emitting each output, the plurality of frequency modulation means being substantially equal to each other in frequency deviation and being substantially identical in the phase of each output (see column 3, lines 59-66; column 4, lines 10-15; column 14, lines 57-65 and FIG.4 where in the first input bit stream and second input bit stream from a composite modulated carrier (dD(t)) signal is coupled into first frequency modulator 102 and second modulator 106 and output signals from each modulator has equal in frequency and phase to each other);

Yoneda et al. disclose a multiplexing means for multiplexing outputs of the plurality of frequency modulation means and outputting multiplexed outputs (see page 362,column 2 under title of **System Configuration And Main Parameters** paragraph 1,lines 1-3; paragraph 4,lines 7-8 and FIG.1 where in plurality of FM channels using identical intermediate frequency (IF) band (1.0 to 1.3 GHz) for modulation and multiplexed by multiplexing module (MUX)); and

a transmitting circuit for outputting optical signals subjected to intensity modulation by the output of the multiplexing means to an optical transmission path (see page 362,column 2 under title of **System Configuration And Main Parameters** paragraph 1,lines 3-5 and FIG.1 where in the output from the multiplexing module is

coupled into DFB –LD for converting the electrical signal into light signal for transmitting on to optical fiber line).

Therefore, it would have been an obviousness to combine Kuniaki et al. with Myers and Yoneda et al.'s invention for the purpose of designing and performing of a multi-channel signals distribution system that can be delivered to multiple users through wideband and low-noise analog link inside the optical signal transmitter because it would allow the optical signal transmitter system having good transmission quality and stable operation.

Regarding to claim 2, Kuniaki et al., Myers and Yoneda et al. disclose everything claimed as applied above (see claim 1). In addition, Kuniaki et al. disclose the optical transmitter further including: the distribution circuit (branching part 7) distributes and outputs the electric signals into N signal parts (N is an integer which is two or greater) (see page 23, [0028], lines 2-3 and FIG.3 where in input signal 10 is coupled into the branching part 7 and the input signal 10 is distributed into plurality of signal parts as two separate output signals 71 and 72);

Both Myers and Yoneda et al. disclose the plurality of frequency modulation means are N FM batch conversion circuits from which each output of the distribution circuit is subjected to frequency modulation to output, and the multiplexing means is an optical multiplexing circuit for multiplexing outputs of the N FM batch conversion circuits and outputting multiplexed outputs, wherein the N FM batch conversion circuits are set to be substantially equal to each other in frequency deviation and in intermediate frequency and to be substantially identical in the phase of each output (see column 3,

lines 59-66; column 4, lines 10-15; column 14, lines 57-65 and FIG.4 **of Myers** where in the first input bit stream and second input bit stream from a composite modulated carrier (dD(t)) signal is coupled into first frequency modulator 102 and second modulator 106 and output signals from each modulator has equal in frequency and phase to each other) and (see page 362,column 2 under title of **System Configuration And Main Parameters** paragraph 1,lines 1-3; paragraph 4,lines 7-8 and FIG.1 of **Yoneda et al.** where in plurality of FM channels using identical intermediate frequency (IF) band (1.0 to 1.3 GHz) for modulation and multiplexed by multiplexing module (MUX));

Therefore, it would have been an obviousness to combine Kuniaki et al. with Myers and Yoneda et al.'s invention for the purpose of designing and performing of a multi-channel signals distribution system that can be delivered to multiple users through wideband and low-noise analog link inside the optical signal transmitter because it would allow the optical signal transmitter system having good transmission quality and stable operation.

7. **Claims 3 and 4** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuniaki et al. (JP 10-013353 attached with English translation document) in view of Myers (US Patent Number 6233254) and Yoneda et al. " Fully Engineered Multi-Channel FM-SCM Video Distribution Systems" dated by 02/94 as applied to claims 2 respectively, above and further in view of Saeki (US Patent Number 6014243).

Regarding to claim 3, Kuniaki et al., Myers and Yoneda et al. disclose everything claimed as applied above (see claim 2). However, they fail to specifically

disclose optical frequency modulation, optical frequency local oscillation portion, an optical multiplexer and optical detector.

Saeki discloses an optical frequency modulation portion for outputting a frequency-modulated optical signal applied frequency modulation to the electric signals input from the distribution circuit as a modulated input (see column 1,lines 32-41 and FIG.1 prior art where in electrical signal 104 which is distributed from the input terminal 103 and optical frequency modulated by modulating light source 101);

an optical frequency local oscillation portion for outputting an optical local oscillation signal having a frequency apart from an optical center frequency of the frequency-modulated optical signal output from the optical frequency modulation portion by a frequency substantially equal to an intermediate frequency (see column 1,lines 32-35 and FIG.1 prior art where in the light source 102 used as optical frequency local oscillation portion for outputting an optical local oscillation signal) ;

an optical multiplexer (optical coupler 111) for multiplexing the frequency-modulated optical signal and the optical local oscillation signal together and outputting a multiplexed optical signal (see column 1, lines 42-46 and FIG.1 prior art where in optical coupler 111 for multiplexing the frequency modulated optical signal and optical local oscillation signal together and outputting as multiplexed optical signal 112);

an optical detector (optical heterodyne detection 113) for applying heterodyne detection to the multiplexed optical signal output from the optical multiplexer and outputting an electric signal having a frequency equal to a difference between an optical frequency of the frequency-modulated optical signal and an optical frequency of the

optical local oscillation signal (see column 1, lines 46-49 where in optical heterodyne detection 113 for applying heterodyne detection to the optical coupler 111 and outputting the output signal 114 from an output terminal 115).

Even though Saeki disclose the optical signal transmitter having optical frequency modulation portion, optical frequency local oscillation portion, optical multiplexing and optical heterodyne detection portion, he fails to specifically disclose the optical local oscillation signal having a frequency apart from an optical center frequency of the frequency-modulated optical signal output from the optical frequency modulation portion.

Kuniaki et al. disclose the optical frequency modulation, which is driven by one of said branched signal (distributed signal) and generates optical frequency-modulated with a center wavelength of lamda 1 and a optical local oscillator portion which generates unmodulated light with a center wavelength of lamda 0 and both center wavelengths of lamda 1 and lamda 0 have an optical center frequency apart from each other (see page 12, lines 3-5;page 12, lines 9-10; page 13,lines 9-12 and FIG.3).

Therefore, it would have been an obviousness to combine Kuniaki et al., Myers and Yoneda et al. with Saeki's invention for the purpose of achieving a heterodyne – type FM modulator with having an optical central frequency apart from optical frequency modulation and optical local oscillator because it would allow the optical signal transmitter having FM signal in a wider band frequency modulation for having good transmission quality and stable operation.

Regarding to claim 4, Kuniaki et al., Myers and Yoneda et al. disclose everything claimed as applied above (see claim 2). However, they fail to specifically disclose a differential distributor with phase inverted and optical detector for applying heterodyne detection to the multiplexed optical signal.

Saeki discloses a differential distributor (180 degree distributor 14) for distributing the electric signal output from the distribution circuit into two electric signals in which phases have been inverted (see column 5, lines 43-48 where in electrical signals 13 is coupled into the distributor 14 and the electrical signals 13 is distributed into plurality of signal parts as two separate output signals and the two output signal are phase inverted by 180 degree) ;

a first optical frequency modulation portion for outputting a first frequency-modulated optical signal applied frequency modulation to one of the two electric signals input from the differential distributor as a modulated input (see column 5,lines 45-55 and FIG.4 where in the amplitude and frequency of first signal 15 from the distributor circuit 14 is optically modulated by first modulation light source 17);

a second optical frequency modulation portion for outputting a second frequency-modulated optical signal applied frequency modulation to the other one of the two electric signals input form the differential distributor as a modulated signal, the second frequency-modulated optical signal having an optical frequency apart from an optical center frequency of the first frequency-modulated optical signal by a frequency substantially equal to an intermediate frequency (see column 5, lines 45-55 and FIG.4

where in the amplitude and frequency of second signal 16 from the distributor circuit 14 is optically modulated by second modulation light source 18);

an optical multiplexer (optical coupler 25) for multiplexing the first frequency-modulated optical signal and the second frequency-modulated optical signal and outputting a multiplexed optical signal (see column 5, lines 56-59 and FIG.4); and

an optical detector for applying heterodyne detection to the multiplexed optical signal output from the optical multiplexer and outputting an electric signal having a frequency equal to a difference between an optical frequency of the first frequency-modulated optical signal and an optical frequency of the second frequency-modulated optical signal (see column 5, lines 59-62 where in optical heterodyne detection 27 for applying heterodyne detection to the optical coupler 25 and outputting the output signal 28 from an output terminal 29).

Even though Saeki disclose the optical signal transmitter having first and second optical frequency modulation portions, optical multiplexing and optical heterodyne detection portion, he fails to specifically disclose the second optical frequency modulation signal having a frequency apart from an optical center frequency of the first frequency-modulated optical signal output from the first optical frequency modulation portion.

Kuniaki et al. disclose the first optical frequency modulation, which is driven by one of said branched signal (distributed signal) and generates first optical frequency-modulated with a center wavelength of lamda 1 and a second optical frequency modulation which is driven by other one of said branched signal (distributed signal) and

generates second optical frequency-modulated with a center wavelength of lamda 2 and both center wavelengths of lamda 1 and lamda 2 have an optical center frequency apart from each other (see page 12, lines 3-5;page 12, lines 6-8; page 13,lines 9-12 and FIG.3).

Therefore, it would have been an obviousness to combine Kuniaki et al., Myers and Yoneda et al. with Saeki's invention for the purpose of achieving a heterodyne – type FM modulator with having an optical central frequency apart from first optical frequency modulation and second optical frequency modulation because it would allow the optical signal transmitter having FM signal in a wider band frequency modulation for having good transmission quality and stable operation.

8. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuniaki et al. (JP 10-013353 attached with English translation document) in view of Myers (US Patent Number 6233254) and Yoneda et al. " Fully Engineered Multi-Channel FM-SCM Video Distribution Systems" dated by 02/94 as applied to claims 2 respectively, above and further in view of Greenwold et al. (US Patent Number 4889134).

Regarding to claim 5, Kuniaki et al., Myers and Yoneda et al. disclose everything claimed as applied above (see claim 2). However, they fail to specifically disclose a voltage-controlled oscillator for converting the electrical signal from the distribution circuit into a signal having a frequency corresponding to a voltage.

Greenwold et al. disclose a voltage-controlled oscillator (voltage-controlled oscillator 260) for converting the electric signal output from the distribution circuit (digital memory 218) into a signal having a frequency corresponding to a voltage thereof with

an intermediate frequency as a center frequency and outputting a converted signal (see column 5, lines 65 through column 6,lines 9 where in VCO 260 is converting the electrical signal 248 from the digital memory 218 into a signal having a central frequency at a predetermined frequency and outputting the signal 262).

Therefore, it would have been an obviousness to combine Kuniaki et al., Myers and Yoneda et al. with Greenwold et al.'s invention for the purpose of adjusting the operation frequency of optical transmitting system by adding a varying voltage from the voltage-controlled oscillator because it would allow the optical signal transmitting system having less interference frequency for making reliable and improving optical transmitting system.

9. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuniaki et al. (JP 10-013353 attached with English translation document) in view of Myers (US Patent Number 6233254) and Yoneda et al. " Fully Engineered Multi-Channel FM-SCM Video Distribution Systems" dated by 02/94 as applied to claims 2 respectively, above and further in view of Greenwold et al. (US Patent Number 4889134) and Uchiyama et al. (US Pub Number 2001/0050768).

Regarding to claim 6, Kuniaki et al., Myers and Yoneda et al. disclose everything claimed as applied above (see claim 2). In addition, Saeki discloses a differential distributor (180 degree distributor 14) for distributing the electric signal output from the distribution circuit into two electric signals in which phases have been inverted (see column 5, lines 43-48 where in electrical signals 13 is coupled into the distributor

14 and the electrical signals 13 is distributed into plurality of signal parts as two separate output signals and the two output signal are phase inverted by 180 degree);

However, they fail to specifically disclose a plurality of voltage-controlled oscillators for converting the electrical signal from the distribution circuit into a signal having a frequency corresponding to a voltage.

Greenwold et al. disclose a first voltage-controlled oscillator (voltage-controlled oscillator 260) for outputting a first frequency-modulated signal obtained by converting one of the two electric signals emitted from the differential distributor so as to have a frequency corresponding to a voltage thereof (see column 5,lines 65 through column 6,lines 9 and FIG.2 where in a first voltage-controlled oscillator 260 is converting the signal 248 from the distribution circuit (digital memory circuit 218) into first frequency-modulated signal corresponding to a voltage of voltage-controlled oscillator);

a second voltage-controlled oscillator for outputting a second frequency-modulated signal obtained by converting the other one of the two electric signals emitted from the differential distributor so as to have a frequency corresponding to a voltage thereof, a center frequency of the second frequency-modulated optical signal being apart from a center frequency of the first frequency-modulated signal by a frequency substantially equal to an intermediate frequency (see column 6,lines 23-27 and FIG.2 where in a second voltage-controlled oscillator 268 is converting the signal 252 from the distribution circuit (digital memory circuit 218) into second frequency-modulated signal corresponding to a voltage of voltage-controlled oscillator and so a

central frequency of the second frequency-modulated signal being apart from the center frequency of the first frequency-modulated signal);

a mixer (a combining type audio amplifier 264) for mixing the first frequency-modulated signal output from the first voltage-controlled oscillator and the second frequency-modulated signal output from the second voltage-controlled oscillator together (see column 6, lines 18-19 and FIG.2 where in the combining type audio amplifier 264 combines the fist and second frequency-modulated signal from first and second voltage-controlled oscillators); and

Uchiyama et al. disclose a low-pass filter (LPF 21) for allowing the electric signal output from the mixer (mixer 26) to pass through, the electric signal having a frequency equal to a difference between a frequency of the first frequency-modulated signal and a frequency of the second frequency-modulated signal (see [0028] lines 1-7 and FIG.1 where in electrical signals from optical balanced circuit 17 and voltage-controlled oscillator 18 are mixed by mixer 26 and after coupled into the low pass filter 21 for filtering the high frequency part from the electrical signal so that the electrical signal is equal to difference between a frequency of the first and second frequency-modulated signal).

Therefore, it would have been an obviousness to combine Kuniaki et al., Myers and Yoneda et al. with Greenwold and Uchiyama et al.'s invention for the purpose of adjusting the operation frequency of optical transmitting system by adding a varying voltage from the voltage-controlled oscillator because it would allow the optical signal

transmitting system having less interference frequency for making reliable and improving optical transmitting system.

10. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuniaki et al. (JP 10-013353 attached with English translation document) in view of Myers (US Patent Number 6233254) and Yoneda et al. " Fully Engineered Multi-Channel FM-SCM Video Distribution Systems" dated by 02/94 as applied to claims 1 respectively, above and further in view of Seto et al. (US Patent Number 6504636).

Regarding to claim 11, Kuniaki et al., Myers and Yoneda et al. disclose everything claimed as applied above (see claim 1). However, they fail to specifically disclose the optical signal receiver with photoelectric conversion and demodulator for retrieving the signal from the optical signal transmitter.

Seto et al. disclose an optical signal receiver (transmitting/receiving station 10A) including a photoelectric conversion (O/E converter 62) means connected to the optical signal transmitter (transmitting/receiving device 32A) via an optical transmission path (optical transmission line 30b) and a frequency demodulation (demodulator 64) means for demodulating an output of the photoelectric conversion means (see column 19,lines 38-41 and FIG.13).

Therefore, it would have been an obviousness to combine Kuniaki et al., Myers and Yoneda et al. with Seto et al.'s invention for the purpose of having the optical signal receiver in the optical transporting system with photoelectric conversion and demodulator because it would allow the optical transporting system having reliable and accurate system for retrieving data signal at the receiver part.

Allowable Subject Matter

11. **Claims 7-10** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Citation of Pertinent Prior Art

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Iida et al. (US Patent Number 6658216) disclose the FM signal optical transmitter and FM signal optical receiver system with voltage-controlled oscillator.

Kikushima et al. (US Patent Number 5896216) disclose AM/PM converter and optical signal transmission system using FM converter.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHYOWAI LIN whose telephone number is (571) 270-1659. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PWL 10/09/07

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KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER